(19) Canadian Intellectual Property Office
An Agency of Industry Canada

Office de la Propri,t, Intellectuelle du Canada
Un organisme d'Industrie Canada

(11) CA 2 290 115 (13) A1

(40) 15.05.2001
(43) 15.05.2001

(12)

(21) 2 290 115

(51) Int. Cl.7: A42B 3/04, G01B 7/14

(22) 15.11.1999

(71) GALLANT, GINA MAY,
2235 Bedard Road, PRINCE GEORGE, B1 (CA).

(72) GALLANT, GINA MAY (CA).

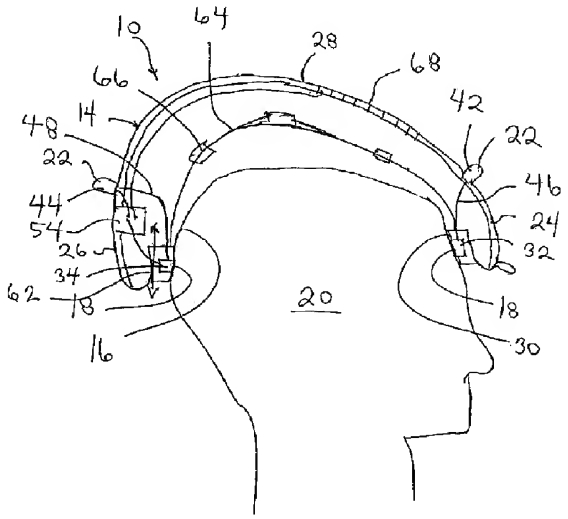
(74) THOMPSON, DOUGLAS B.

(54) METHODE DE VERIFICATION DU BON POSITIONNEMENT D'UN CASQUE PROTECTEUR ET CASQUE PROTECTEUR

(54) METHOD OF VERIFYING CORRECT POSITIONING OF A SAFETY HELMET AND A SAFETY HELMET

(57)

A method of verifying correct positioning of a safety helmet and a safety helmet modified in accordance with the teachings of the method. A helmet is provided having a body with a head receiving cavity. The helmet is modified by positioning within the head receiving cavity of the helmet at least two contact members in spaced relation. The positioning of the at least two contact members is such that a head positioned in the head receiving cavity will only come in contact with all of the contact members when the helmet fits and is properly positioned on the head. The contact members are electrically coupled with a position indicator, such as a light, that illuminates to provide confirmation that the contact members are in contact with the head.



OPIC
OFFICE DE LA PROPRIÉTÉ INTELLECTUELLE DU CANADA

CIPO
CANADIAN INTELLECTUAL PROPERTY OFFICE

(12) (19) (CA) **Demande-Application**

(21) (A1) **2,290,115**

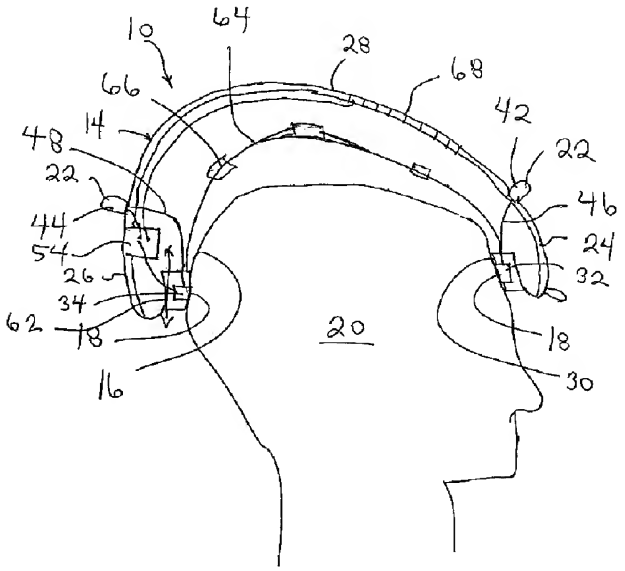
(22) 1999/11/15
(43) 2001/05/15

(72) GALLANT, GINA MAY, CA
(71) GALLANT, GINA MAY, CA

(51) Int.Cl.[7] A42B 3/04, G01B 7/14

(54) **METHODE DE VERIFICATION DU BON POSITIONNEMENT D'UN CASQUE PROTECTEUR ET CASQUE PROTECTEUR**

(54) **METHOD OF VERIFYING CORRECT POSITIONING OF A SAFETY HELMET AND A SAFETY HELMET**



(57) A method of verifying correct positioning of a safety helmet and a safety helmet modified in accordance with the teachings of the method. A helmet is provided having a body with a head receiving cavity. The helmet is modified by positioning within the head receiving cavity of the helmet at least two contact members in spaced relation. The positioning of the at least two contact members is such that a head positioned in the head receiving cavity will only come in contact with all of the contact members when the helmet fits and is properly positioned on the head. The contact members are electrically coupled with a position indicator, such as a light, that illuminates to provide confirmation that the contact members are in contact with the head.

ABSTRACT OF THE DISCLOSURE

A method of verifying correct positioning of a safety helmet and a safety helmet modified in accordance with the teachings of the method. A helmet is provided having a body with a head receiving cavity. The helmet is modified by positioning within the head receiving cavity of the helmet at least two contact members in spaced relation. The positioning of the at least two contact members is such that a head positioned in the head receiving cavity will only come in contact with all of the contact members when the helmet fits and is properly positioned on the head. The contact members are electrically coupled with a position indicator, such as a light, that illuminates to provide confirmation that the contact members are in contact with the head.

TITLE OF THE INVENTION:

Method Of Verifying Correct Positioning Of A Safety Helmet And A Safety Helmet

NAME(S) OF INVENTOR(S):

Gina May Gallant

FIELD OF THE INVENTION

The present invention relates to a method Of verifying correct positioning of a safety helmet and a safety helmet modified in accordance with the teachings of the method.

BACKGROUND OF THE INVENTION

Safety helmets are used in a wide variety of activities to protect the wearer's head from violent impact. It is essential that the safety helmet fit properly and be correctly positioned on the wearer's head. If the safety helmet is too large or too small, there is a danger that the helmet will become dislodged upon impact. If the safety helmet is not correctly positioned, there is a danger that a portion of the wearer's head will strike an object ahead of the helmet. For example, when a helmet worn too far back on the head, the forehead of the wearer is exposed should the wearer fall forward.

SUMMARY OF THE INVENTION

What is required is some method of objectively verifying that a safety helmet both fits and is correctly positioned.

According to one aspect of the present invention there is provided a method Of verifying correct positioning of a safety helmet. The method includes a first step of providing a helmet having a body with a head receiving cavity. The method includes a second step of positioning within the head receiving cavity of the helmet at least two contact members in spaced relation. The positioning of the at least two contact members

is such that a head positioned in the head receiving cavity will only come in contact with all of the at least two contact members when the helmet fits and is properly positioned on the head. The method includes a third step of electrically coupling the at least two contact members to at least one position indicator that provides confirmation that each of the at least two contact members is in contact with the head.

According to another aspect of the present invention there is provided a safety helmet which includes a body with a head receiving cavity. At least two contact members are positioned in spaced relation within the head receiving cavity. The positioning of the at least two contact members is such that a head positioned in the head receiving cavity will only come in contact with all of the at least two contact members when the helmet fits and is properly positioned on the head. At least one position indicator is electrically coupled with the at least two contact members. The position indicator provides confirmation that each of the at least two contact members is in contact with the head.

The above described method and the safety helmet modified in accordance with the teachings of the method provide an objective determination as to whether the safety helmet fits and whether the helmet is properly positioned on the persons head. The form of position indicator that is viewed as being most readily adapted to the teachings of the invention is a light. The form of contact member that is viewed as most readily adapted for use in accordance with the teachings of the invention is a pressure switch. As long as pressure is exerted against the pressure switch by the wearer's head, the position indicator lights will remain illuminated. Several contacts positioned around circumferential sidewalls of the head receiving cavity of the helmet are preferred, but a safety helmet can be constructed using as few as two contact members. If only two contact members were to be used, the preferred positioning would be one at the front of the helmet and another

at the back of the helmet; as front and back placement is viewed as being most critical.

Although this has application for use by adults, it is believed to be most significant in relation to helmets worn by children. An adult assisting a child to put on the helmet, looks for the illumination of the position indicator lights to confirm that contact has been made by the contact switches at both the front and the back of the helmet. If only the back position indicator light is illuminated, the adult alters the positioning of the helmet until the front position indicator light is also illuminated. Conversely, if only the front position indicator light is illuminated, the adult alters the positioning of the helmet until the back position indicator light is also illuminated. If the adult is unable to simultaneously illuminate both the front position indicator light and the back position indicator light, the helmet is either too large or too small for the child. If the child put on his or her own helmet, the adult can tell from a distance whether the helmet is correctly positioned by looking to see whether only some or all of the lights are illuminated.

A child can learn to put on his or her own helmet by looking into a mirror. The child learns that the helmet is not properly positioned unless all of the lights are illuminated. This serves a valuable role in training the child. The failure of the light to illuminate tells the child that the helmet is not positioned right, the subsequent illumination of the light confirms correct positioning and simultaneously rewards the child. In this manner, the safety helmet serves as a valuable tool in teaching the child to put their helmet on properly. Over prolonged usage, the child learns, through repetitive action, how the helmet feels when it is correctly positioned, and the importance of the lights will diminish.

There is not always a mirror available, nor is there always an adult available to assist the child. Even more

beneficial results may, therefore, be obtained when a master position indicator light is mounted to the body of the helmet at a position where the master position indicator light is visible to the child. This master position indicator light should become illuminated only when all of the contact switches are in contact with the child's head. A child putting on the helmet, without the benefit of a mirror, can then look at the master position indicator light for feedback and reward.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of the invention will become more apparent from the following description in which reference is made to the appended drawings, wherein:

FIGURE 1 is a side elevation view, in section, of a safety helmet constructed in accordance with the teachings of the present invention.

FIGURE 2 is a top plan view of the safety helmet illustrated in **FIGURE 1**.

FIGURE 3 is a bottom plan view of the safety helmet illustrated in **FIGURE 1**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiment, a safety helmet generally identified by reference numeral 10, will now be described with reference to **FIGURES 1** through **3**.

Referring to **FIGURE 1**, safety helmet 10 is constructed in accordance with the teachings of a method Of verifying correct positioning of a safety helmet 10. A first step involves providing safety helmet 10 having a body 14 with a head receiving cavity 16. A second step involves positioning within head receiving cavity 16 of safety helmet 10 at least two contact members 18 in spaced relation. The positioning of contact members 18 is such that a head 20 positioned in head receiving cavity 16 will only come in contact with all of contact members 18, when safety helmet 10 fits and is properly

positioned on head 20. A third step involves electrically coupling contact members 18 to at least one position indicator, such as a lights 22. The illumination of lights 22 provide confirmation that each of contact members 18 is in contact with head 20.

The illustrated embodiment of safety helmet 10, will now be described in detail with reference to **FIGURES 1** through **3**. Referring to **FIGURE 1**, body 14 of safety helmet 10 has a front 24, a back 26 and an external shell 28. Referring to **FIGURE 3**, head receiving cavity 16 has a circumferential sidewall 30. There are four contact members 18, in the form of pressure switches, mounted in spaced relation to circumferential sidewall 30 of head receiving cavity 16. These contact members 18 include two front contact switches 32 at front 24 of body 14 and two back contact switches 34 at back 26 of body 14. The positioning of front contact switches 32 and back contact switches 34 is such that when head 20 is positioned in head receiving cavity 16, head 20 will only come in contact with both front contact switches 32 and back contact switches 34 when safety helmet 10 fits and is properly positioned on head 20. Optionally, a left side contact switch 38 and a right side contact switch 40 may also be provided. Referring to **FIGURE 2**, position indicator lights 22 include several front position indicator lights 42 and several back position indicator lights 44. Referring to **FIGURE 1**, front position indicator lights 42 are mounted on external shell 28 at front 24 of body 14 and electrically coupled by conductive wires 46 to front contact switches 32 to form a conductive circuit. Illumination of front position indicator lights 42 provides confirmation that front contact switches 32 are in contact with head 20 to complete this conductive circuit. Back position indicator lights 44 are mounted on external shell 28 at back 26 of body 14 and electrically coupled by conductive wires 48 to back contact switches 34. Illumination of back position indicator lights 44 provides confirmation that back contact switches 34 are in contact with head 20 to complete this conductive

circuit. Referring to **FIGURE 2**, Optionally, side position indictor lights 50 may be mounted on external shell 28 of body 14. Referring to **FIGURE 3**, side position indicator lights are electrically coupled by conductive wires 52 to left side contact switch 38 and right side contact switch 40. Illumination of side position indicator lights 50 provides confirmation that left side contact switch 38 and right side contact switch 40 are in contact with head 20 to complete this conductive circuit. A battery housing 54 is mounted to body 14 which is adapted to receive a battery 56. Each of the above described conductive circuits are electrically coupled to battery housing 54 and draw required power from battery 56. Referring to **FIGURE 3**, it is preferred that a master position indicator light 58 be mounted to body 14 in a position where master position indicator light 58 is visible to the wearer. Master position indicator light 58 is illuminated only when all of the above described contact switches are in contact with the head. The illumination of master position indicator light gives the wearer assurance that safety helmet 10 is correctly positioned. The illumination of the indicator lights has a collateral benefit of increasing visibility. This visibility can be further increased by the addition of reflectors or reflective strips 60.

A proto-type was constructed to prove the viability of the invention. In the proto-type light emitting diodes (LED) were used for the lights. The lights selected has "plug in" bulbs, similar to those in common usage in indoor lights, such as Xmas Tree lights. Coated wire with a gauge of between 20 and 26 was used. The LEDs in each circuit were hooked up in parallel. The contact switches in each circuit were hooked up in series. Although the resulting external shell was not tested, it is believed that where holes had to be drilled to accommodate wires, such holes had a negligible effect on the structural integrity of the safety helmet. A three volt battery housing was used that was adapted to receive two "AAA" batteries. The capacity of the battery housing can be altered depending upon

the number and power requirements of the LEDs used.

The Applicant has conducted experiments to determine what is the fewest number of switches that can be used in order to keep costs to a minimum. The fewest number of switches to give a consistent satisfactory result is two. The applicant conducted experiments to determine the best positioning for those two switches. One configuration involved placing one switch at the front of the safety helmet and another switch at the back of the helmet. Another configuration involved placing switches opposed sides of the helmet. The best results in a two switch configuration were obtained when the two switches were both placed at the front of the safety helmet in spaced relation. This configuration was most readily adaptable to differing head shapes.

Regardless of which switch configuration was selected, the performance could be improved by having the switches height adjustable. Height adjustment helped in adapting to differing head shapes. Referring to **FIGURE 1**, contact members or switches 18 are illustrated as being height adjustable as indicated by arrow 62. There are various means by which contact members 18 may be made height adjustable. In the illustrated embodiment, the height adjustment is effected by raising or lowering circumferential sidewall 30 by means of straps 64 that can be adjusted at adjustment points 66.

The Applicant also conducted experiments to determine which of the various alternative wiring configurations was most cost effective. The most cost effective wiring configuration involved connecting the switches so that none of the indicator lights would go on unless all of the switches were engaged. Beneficial results were also obtained when the lights were connected to individual switches or groupings of switches. This type of wiring had the advantage of giving a clear indication as to which switch was not engaged, but had the disadvantage of additional expense.

Although the proto-type illustrated was battery powered, it would be possible to prolong battery life by having a power storage battery that is capable of being charged through the use of a solar panel. Referring to **FIGURE 1**, the illustrated embodiment is shown with a solar panel battery recharging unit 68.

It will be apparent to one skilled in the art that modifications may be made to the illustrated embodiment without departing from the spirit and scope of the invention as hereinafter defined in the Claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A method Of verifying correct positioning of a safety helmet, comprising the steps of:

providing a helmet having a body with a head receiving cavity;

positioning within the head receiving cavity of the helmet at least two contact members in spaced relation, the positioning of the at least two contact members being such that a head positioned in the head receiving cavity will only come in contact with all of the at least two contact members when the helmet fits and is properly positioned on the head;

electrically coupling the at least two contact members to at least one position indicator that provides confirmation that each of the at least two contact members is in contact with the head.

2. The method as defined in Claim 1, the helmet having a front and a back, the at least two contact members including at least one front contact member at the front of the helmet and at least one back contact member at the back of the helmet.

3. The method as defined in Claim 1, the helmet having a position indicator for each of the at least two contact members.

4. The method as defined in Claim 2, the helmet having a position indicator for the at least one front contact member and the at least one back contact member.

5. The method as defined in Claim 1, the position indicator being a light.

6. The method as defined in Claim 5, the light being a light emitting diode positioned on the external shell of the helmet.

7. The method as defined in Claim 1, the head receiving cavity of the helmet having a circumferential sidewall and the at least two contact members being mounted to the circumferential sidewall.

8. The method as defined in Claim 1, the at least two contact members being switches.

9. The method as defined in Claim 1, a battery housing being mounted to the helmet, and the at least two contact switches being electrically coupled to the at least one position indicator by an electric circuit adapted to be powered by a battery positioned in the battery housing.

10. The method as defined in Claim 1, the at least two contact members being height adjustable relative to the head receiving cavity.

11. A safety helmet, comprising:

a body with a head receiving cavity;

at least two contact members positioned in spaced relation within the head receiving cavity, the positioning of the at least two contact members being such that a head positioned in the head receiving cavity will only come in contact with all of the at least two contact members when the helmet fits and is properly positioned on the head;

at least one position indicator electrically coupled with the at least two contact members, such that the at least one position indicator provides confirmation that each of the at least two contact members is in contact with the head.

12. The safety helmet as defined in Claim 11, wherein the body has a front and a back, the at least two contact members including at least one front contact member at the front of the body and at least one back contact member at the back of the body.

13. The safety helmet as defined in Claim 11, wherein the body has a front and a back, the at least two contact members being positioned in spaced relation at the front of the body.

14. The safety helmet as defined in Claim 11, wherein the at least two contact members are height adjustable relative to the head receiving cavity.

15. The safety helmet as defined in Claim 11, wherein a position indicator is provided for each of the at least two contact members.

16. The safety helmet as defined in Claim 12, wherein the a position indicator is provided for the at least one front contact member and the at least one back contact member.

17. The safety helmet as defined in Claim 11, wherein the

position indicator is a light.

18. The safety helmet as defined in Claim 17, wherein the light is a light emitting diode.

19. The safety helmet as defined in Claim 11, wherein the at least one position indicator is positioned on the external shell of the helmet.

20. The safety helmet as defined in Claim 11, wherein the head receiving cavity of the helmet has a circumferential sidewall and the at least two contact members are mounted to the circumferential sidewall.

21. The safety helmet as defined in Claim 11, wherein the at least two contact members are switches.

22. The safety helmet as defined in Claim 11, wherein a battery housing is mounted to the helmet, and the at least two contact switches are electrically coupled to the at least one position indicator by an electric circuit adapted to be powered by a battery positioned in the battery housing.

23. A safety helmet, comprising:

a body having a front, a back, an external shell, and a head receiving cavity with a circumferential sidewall;

contact switches mounted in spaced relation to the circumferential sidewall of the head receiving cavity, the contact switches including at least one front contact switch at the front of the body and at least one back contact member at the back of the body, the positioning of the at least one front contact switch and the at least one back contact switch being such that a head positioned in the head receiving cavity will only come in contact with the at least one front contact switch and the at least one back contact switch when the helmet fits and is properly positioned on the head;

position indicator lights including at least one front position indicator light and at least one back position indicator light, the at least one front position indicator light being mounted on the external shell of the body and electrically coupled to the at least one front contact switch, such that illumination of the at least one front position indicator light provides confirmation that the at least one front contact switch is in contact with the head, the at least one back position indicator light being mounted on the external shell of the body and electrically coupled to the at least one back contact switch, such that illumination of the at least one back position indicator light provides confirmation that the at least one back contact switch is in contact with the head;

a battery housing mounted to the body, and the contact switches being electrically coupled to the position indicator lights by an electric circuit adapted to be powered by a battery positioned in the battery housing.

24. The safety helmet as defined in Claim 23, wherein the position indicator lights are light emitting diodes.

25. The safety helmet as defined in Claim 23, wherein a master position indicator light is mounted to the body at a position

where the master position indicator light is visible to the wearer, the master position indicator light being illuminated only when all of the contact switches are in contact with the head.

26. The safety helmet as defined in Claim 23, wherein the at least two contact members are height adjustable relative to the head receiving cavity.

27. A safety helmet, comprising:

a body having a front, a back and a head receiving cavity with a circumferential sidewall;

two contact members positioned in spaced relation along the circumferential sidewall of the head receiving cavity at the front of the body, the height of the two contact members on the circumferential sidewall being adjustable, the positioning of the two contact members being such that a head positioned in the head receiving cavity will only come in contact with both of the two contact members when the helmet fits and is properly positioned on the head;

a position indicator light mounted on the body and electrically coupled with the two contact members, such that the position indicator light provides confirmation that each of the two contact members is in contact with the head.

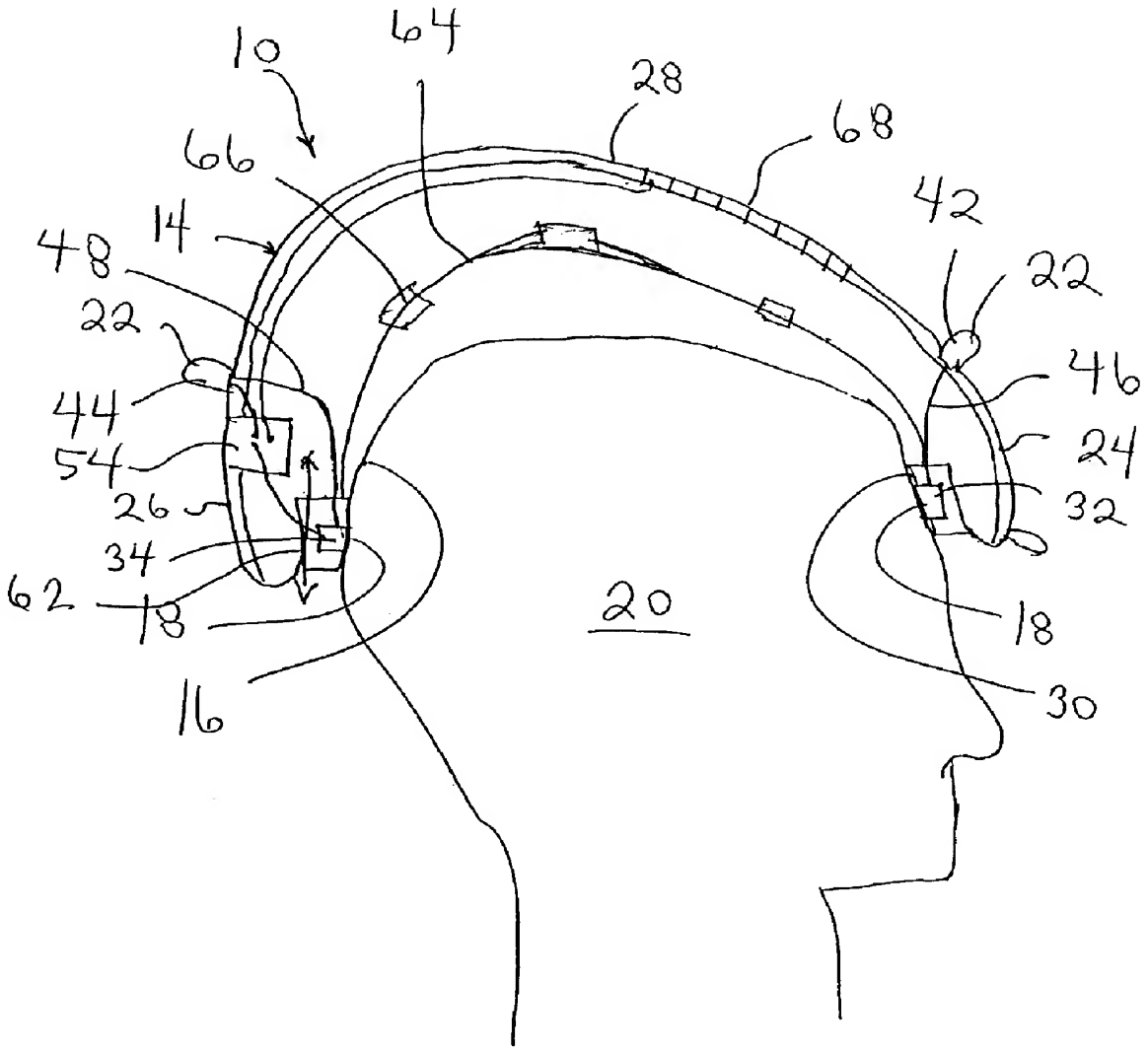


FIGURE 1

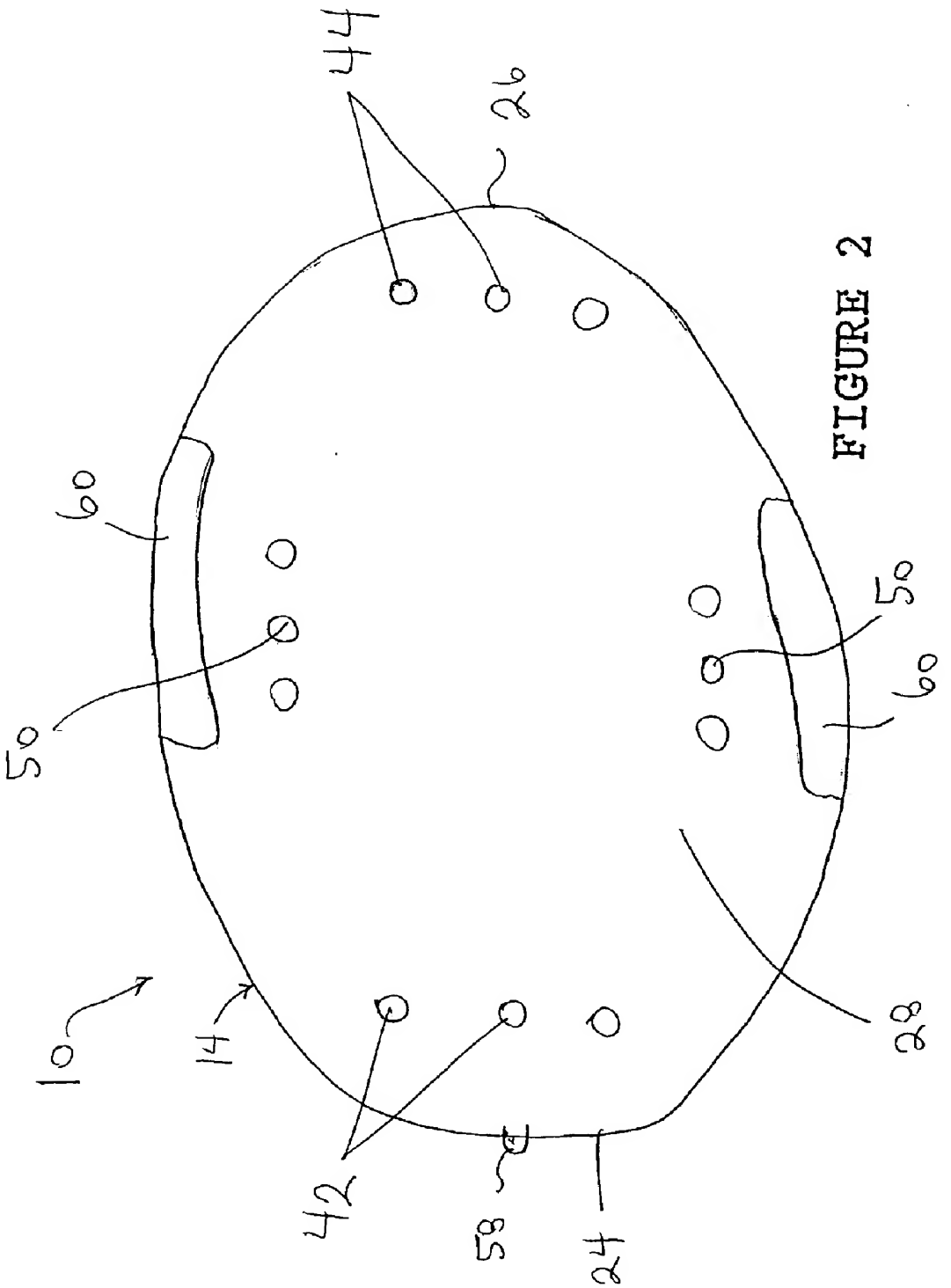


FIGURE 2

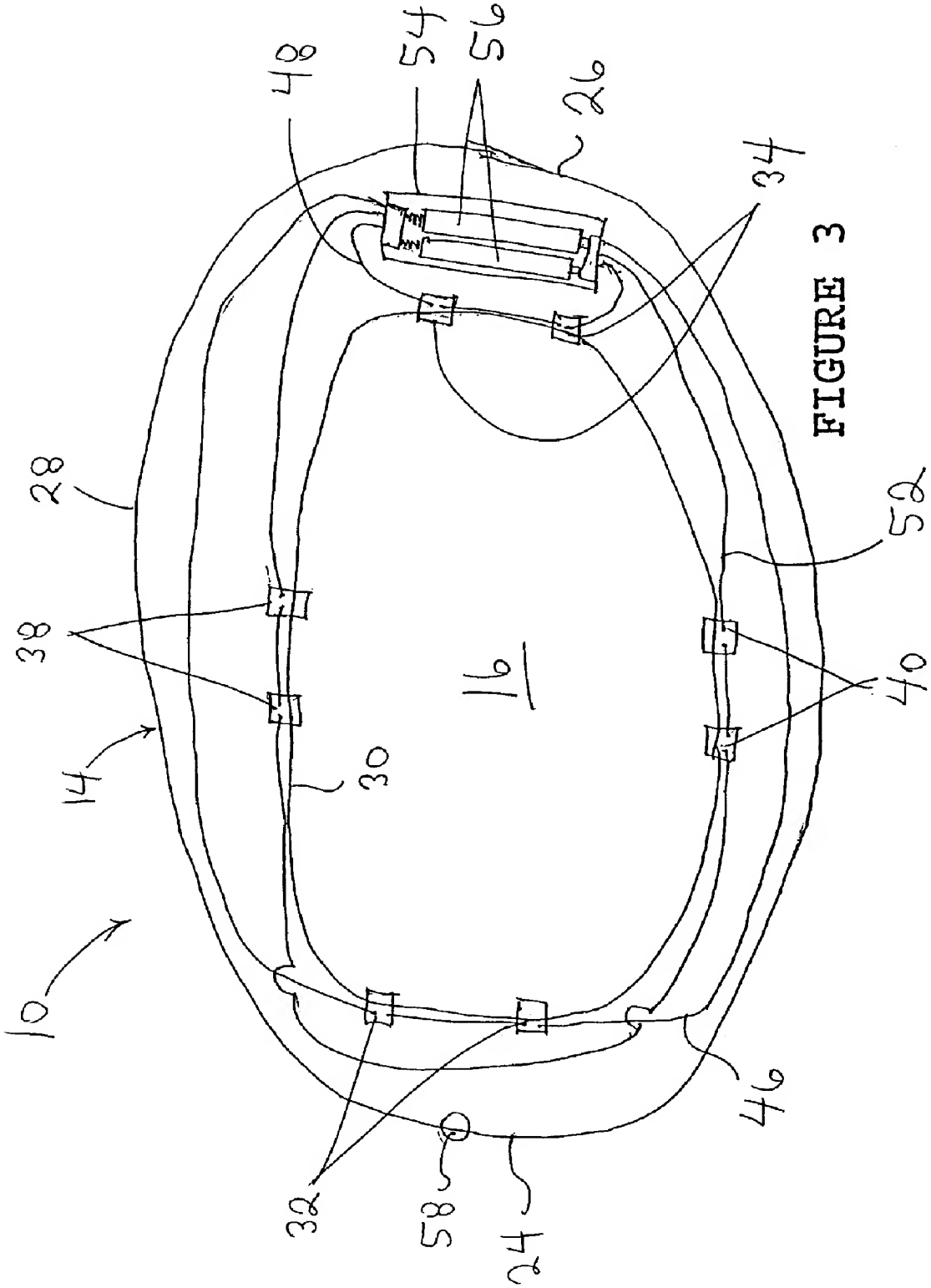


FIGURE 3